September 2025. The vacuum is described as a plasma-like etheric medium

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Abstract

We present the modern formulation of the *Cosmology of the Quarkbase*, a unified framework grounded on a minimal set of axioms: the universe is finite; its total volume is conserved; all physical structure arises from indivisible, perfectly spherical and undeformable quarkbases; and these quarkbases are immersed in a frictionless, invisible plasma-like etheric medium whose pressure field $\Psi(x,t)$ governs all dynamical behaviour. From these principles, gravity, electromagnetism, nuclear forces, and quantum phenomena emerge as geometric and dynamical redistributions of pressure within this medium.

The emergent gravitational interaction arises from the pressure gradients generated by the presence of N quarkbases, yielding a Yukawa-type potential that reproduces the Newtonian regime for $r \ll \lambda$ under the exact condition

$$\gamma\, v_q\, \alpha = 4\pi\, G\, m_q^2.$$

Here λ represents the coherence scale of the background etheric medium; for galactic values (10–100 kpc, $m_\Psi \sim 10^{-27}$–10^{-29} eV) the theory is consistent with all laboratory constraints while producing observable cosmological effects.

The framework reinterprets cosmological redshift as a temporal evolution of the refractive index $n(t)$ of the ether, rather than a metric expansion. It also provides predictions for the CMB (suppression of low multipoles, ISW modifications, acoustic-peak shifts), gravitational lensing without dark matter, and galaxy rotation curves through finite-range pressure potentials. A set of observational and experimental signatures is outlined as a direct test of the framework.

1 Introduction

Contemporary physics faces several open problems: dark matter, dark energy, and the incompatibility between general relativity and quantum theory. The motivation of this framework is to reinterpret physical reality as a finite, static, pressure-responsive medium composed solely of indivisible quarkbases immersed in a frictionless plasma-like ether. All forces arise not from independent fields, but from pressure redistributions and geometric deformations of $\Psi(x,t)$.

2 Fundamental Axioms

1. **Finite and genesis-free universe** with constant total volume.
2. **Plasma-like ether** with density $\rho_p(x,t)$ and zero friction coefficient ($\mu = 0$).
3. **Elementary constituents: spherical, undeformable quarkbases** with volume v_q and emergent energy $m_q c^2$.
4. **Global volume conservation:**
$$\int \rho_p\, d^3x + N\, v_q = \rho_p^{(0)}\, V_U.$$
5. **Interactions as pressure redistributions** within the ether.
6. **Gravity, electromagnetism, and nuclear forces** as linear and nonlinear modes of $\Psi(x,t)$.

3 Derivation of Gravity

In the presence of quarkbases, the pressure field satisfies a Yukawa-type potential:

$$\Psi(r) = \frac{\alpha}{4\pi}\frac{e^{-r/\lambda}}{r}. \tag{1}$$

Its radial gradient is

$$\nabla\Psi(r) = -\frac{\alpha}{4\pi}e^{-r/\lambda}\left(\frac{1}{r^2} + \frac{1}{\lambda r}\right)\hat{r}, \tag{2}$$

and the emergent force becomes

$$F(r) = \gamma v_q \frac{\alpha}{4\pi}e^{-r/\lambda}\left(\frac{1}{r^2} + \frac{1}{\lambda r}\right). \tag{3}$$

For $r \ll \lambda$,

$$F(r) \approx \frac{Gm_q^2}{r^2}, \qquad \Rightarrow \qquad \gamma v_q \alpha = 4\pi G m_q^2. \tag{4}$$

Screening mechanisms arise in high-density environments due to ether compression, reducing the effective interaction range without violating experimental bounds.

4 Cosmology and the CMB

Cosmological redshift is interpreted as a temporal evolution of the ether's refractive index:

$$1 + z = \frac{n(t_0)}{n(t_e)}. \tag{5}$$

CMB anisotropies depend on the field mass parameter $m_\Psi = \hbar c/\lambda$. The framework predicts:

- suppression of low multipoles,
- modifications of the integrated Sachs–Wolfe effect,
- shifts in acoustic peaks,
- angle–scale correlations induced by pressure gradients.

5 Technological Applications

- Reactors based on surface-energy extraction from the Ψ field.
- Ultra-strong materials and plasmionic computing.
- Reactionless propulsion derived from anisotropic pressure modes.

6 Predictions and Falsifiability

1. Pressure-wave signatures detectable in dusty-plasma experiments.
2. Deviations from Newtonian behaviour at microscale under incomplete screening.
3. Systematic delays in FRBs and pulsars due to variations in $n(x)$.
4. Suppression of low-ℓ multipoles in the CMB.
5. Galaxy rotation curves without dark matter through finite-range potentials.

7 Conclusions

The Cosmology of the Quarkbase forms a coherent and falsifiable framework in which classical and quantum phenomena emerge from pressure redistributions in a plasma-like ether. The global parameters are consistent with existing experimental bounds and produce testable predictions across cosmology, optics, galactic dynamics, and laboratory plasma physics.